UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/731,640	12/07/2000	Joshua I. Pine	044368.0371	9957

25700 7590 06/10/2005

FARJAMI & FARJAMI LLP
26522 LA ALAMEDA AVENUE, SUITE 360
MISSION VIEJO, CA 92691

EXAMINER	
HENN, TIMOTHY J	

ART UNIT	PAPER NUMBER
2612	

DATE MAILED: 06/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/731,640	PINE, JOSHUA I.	
	Examiner	Art Unit	
	Timothy J. Henn	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 December 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 December 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 16 December 2004 have been fully considered but they are not persuasive. Applicant argues that evidence of a teaching or suggestion is required to show that it would have been obvious to transform the frequency domain data into spatial data as suggested by the examiner. In order to meet the applicant's request the claim rejections below have been amended to include documentary evidence as is allowed by MPEP §2144.03.

The examiner further notes that claims 21 and 22 have not been amended and the applicant has given no specific reasons why they should be considered allowable, therefore the rejection based on Kostrzewski has been repeated.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, motivation can be found in the references as is described below.

In response to applicant's argument that Artigalas has different motivation for the use of a Fourier lens than the applicant, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art

cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Response to Amendment

2. Applicants amendments to the specification overcome the previous objections, these objections are therefore withdrawn.

Claim Rejections - 35 USC § 102

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 21 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Kostrzewski et al. (SPIE).

[claim 21]

In regard to claim 21, note that Kostrzewski et al. discloses an imaging system comprising means for capturing an image in the spatial frequency domain (Figure 1, "CCD Camera"); means communicatively coupled with the capturing means for creating a digital representation of the spatial frequency components of the captured image (Figure 1; Section 2; The office notes that an A-to-D converter is inherent in the system since the data is processed using a digital signal processor, it must be converted to digital data prior to processing); and means communicatively coupled with the digital representation creation means for transforming the digital representation of the spatial frequency components into spatial-domain image data (Figure 1, "DSP chip"; Section

2).

[claim 22]

In regard to claim 22, note that Kostrzewski et al. discloses a system comprising : means for capturing a diffraction pattern of an image object (Figure 1, "CCD Camera", Section 2), means communicatively coupled with the capturing means for producing digital spatial frequency-domain image data of the captured diffraction pattern of the object (Figure 1; Section 2; The office notes that an A-to-D converter is inherent in the system since the data is processed using a digital signal processor, it must be converted to digital data prior to processing); and means coupled with the data producing means for converting the spatial frequency-domain image data to a spatial domain (Figure 1, "DSP chip"; Section 2).

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1-4, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atrigalas (US 5,181,102) in view of Penney (US 5,515,112).

[claim 1]

In regard to claim 1, note that Artigalas discloses an imaging system comprising an imager having an array of photocells, where each photocell produces an electrical response to light exposure (Figure 2, Item 1; Column 1, Lines 53-55), and the electrical responses of the array of photocells together represent spatial frequency-domain image

data (Figure 2, The office notes that since the incoming light passes through a Fourier lens, the image data captured by the CCD will represent spatial frequency-domain image data). Therefore, it can be seen that Artigalas does not disclose an image processor that receives the spatial frequency-domain image data from the imager and transforms the spatial frequency-domain image data into spatial-domain image data.

However, it is noted that Artigalas discloses the a system which is used to remove noise from video signals which are fed into a high-definition television (e.g. Column 1, Line 5 - Column 2, Line 17). Penney shows that in television systems when data is transformed into the frequency domain data, the data must be transformed back into time domain data in order to output proper television signals which may then be displayed (Figure 1, Items 26, 28 and 30; c. 2, l. 20-67). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to convert the spatial frequency-domain image data into spatial-domain image data using an inverse Fourier transform processor as taught by Penney.

[claim 2]

In regard to claim 2, note that Artigalas discloses a filter (Figure 2, Item 92) that detects and removes high diagonal spatial frequencies or "noise" before the system transforms the spatial frequency-domain image data into spatial-domain image data.

[claim 3]

In regard to claim 3, note that Artigalas discloses the displaying of the spatial-domain image data on a television or "user interface" (e.g. Column 1, Line 5 - Column 2,

Line 17).

[claim 4]

In regard to claim 3, note that Artigalas further discloses an optical lens (Figure 2, Item 91) placed between a spatial representation of an image object and the imager, the optical lens performing an approximate Fourier transform (Column 3, Lines 23-33) on light emanating from the spatial representation of the image object towards the imager.

[claim 7]

In regard to claim 7, note that Artigalas further discloses a focusing lens (Figure 2, Item 4) and a transform lens (Figure 2, Item 91) that are placed between the imager and an image object; light traveling from the image object to the imager; the focusing lens focusing the light onto an image plane between the focusing lens and the transform lens (The office notes that the position of the focusing plane is inherent if the image is to be well-focused on the image sensor); the transform lens receiving the light from the focusing lens and bending the light to form a diffraction pattern of the image object at a transform plane of the transform lens (Column 3, Lines 23-33); and the imager being placed at the transform lane of the transform lens to capture the diffraction pattern of the object (Figure 2).

[claim 8]

In regard to claim 8, Artigalas discloses all limitations except for a user interface that permits the user to adjust distances between the focusing lens, the transform lens and the imager. However, it is well known in the art to allow users to adjust the relative positions of lenses in optical systems in order to properly calibrate the system to obtain

the best quality images possible from the system (Official Notice). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a user interface to adjust the relative positions of the focus lens, transform lens and imager to obtain the best quality images possible from the system.

7. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atrigalas (US 5,181,102) in view of Penney (US 5,515,112) in view of Kostrzewski (SPIE).

[claims 5 and 6]

Regarding claims 5 and 6 Artigalas in view of Penney lacks both a spatial light modulator and a coherent light source. However, it is known in the art to create images using spatial light modulators illuminated by coherent light sources, see for example Figure 1 of Kostrzewski which allows comparing an input image to a reference image side by side. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a spatial light modulator and coherent light source as taught by Kostrzewski in order to allow for comparisons between input and reference images.

8. Claims 9-15 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Artigalas (US 5,181,102) in view of Penney (US 5,515,112) in view of Fowler et al. (US 5,461,425).

[claim 9]

In regard to claim 9, note that Artigalas discloses digital imaging means for capturing a diffraction pattern of an object illuminated by an incoherent light source (Figure 2, Item 1). Therefore, it can be seen that Artigalas lacks means for converting the spatial frequency-domain image data into spatial-domain image data suitable for spatial image display of the object.

However, it is noted that Artigalas discloses the a system which is used to remove noise from video signals which are fed into a high-definition television (e.g. Column 1, Line 5 - Column 2, Line 17). Penney shows that in television systems when data is transformed into the frequency domain data, the data must be transformed back into time domain data in order to output proper television signals which may then be displayed (Figure 1, Items 26, 28 and 30; c. 2, l. 20-67). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to convert the spatial frequency-domain image data into spatial-domain image data using an inverse Fourier transform processor as taught by Penney. It can further be seen that Artigalas lacks digital imaging means for producing digital spatial frequency-domain image data corresponding to the captured diffraction pattern of the object.

It is further noted that Artigalas discloses that the use of "other types of sensors such as, for example, matrix-structure sensors, do[es] not depart from the scope of the present invention". Fowler et al. discloses an image sensor which includes pixel level A/D conversion, a technique which reduces the effect of parasitic capacitances on the readout bit lines (e.g. Column 4, Lines 13-17). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the image

sensor of Fowler et al. to readout the spatial frequency-domain image data digitally rather than in analog form to reduce the effects of parasitic capacitances.

[claim 10]

In regard to claim 10, note that Artigalas further discloses means for detecting and removing high diagonal frequencies or "noise" from the spatial frequency-domain image data (Figure 2, Item 92).

[claim 11]

In regard to claim 11, note that Artigalas further discloses means for displaying a spatial image of the object (e.g. Column 1, Line 5 - Column 2, Line 17).

[claim 12]

In regard to claim 12, note that Artigalas lacks means for storing the spatial-domain image data of the object. However, it is well known in the art to store images in digital memory for later processing, printing or review (Official Notice). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a device to store the spatial-domain image data of Kostrzewski et al. to be able to process, print or review the image data at a later time.

[claim 13]

In regard to claim 13, note that Artigalas lacks a user interface means for controlling an amount of time for capturing the image. However, it is well known in the art to provide cameras with exposure control systems to limit the amount of light during a single exposure to avoid saturating the photo sensors of the imaging device (Official Notice). Therefore, It would have been obvious to one of ordinary skill in the art at the

time the invention was made to include an exposure control system to avoid saturating the photo sensors of the imaging device.

[claim 14]

In regard to claim 14, note that Artigalas lacks a user interface means for controlling an amount of illumination for capturing images. However, it is well known in the art to provide cameras with exposure control systems to limit the amount of light during a single exposure to avoid saturating the photo sensors of the imaging device (Official Notice). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an exposure control system to avoid saturating the photo sensors of the imaging device.

[claim 15]

In regard to claim 15, note that Artigalas discloses a method comprising capturing a diffraction pattern of an image object (e.g. Figure 2; Column 3, Lines 23-33). Therefore it can be seen that Artigalas lacks a method of converting the spatial frequency-domain image data to a spatial domain.

However, it is noted that Artigalas discloses the a system which is used to remove noise from video signals which are fed into a high-definition television (e.g. Column 1, Line 5 - Column 2, Line 17). Penney shows that in television systems when data is transformed into the frequency domain data, the data must be transformed back into time domain data in order to output proper television signals which may then be displayed (Figure 1, Items 26, 28 and 30; c. 2, l. 20-67). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to convert

the spatial frequency-domain image data into spatial-domain image data using an inverse Fourier transform processor as taught by Penney. It can further be seen that Artigalas lacks producing digital spatial frequency-domain image data corresponding to the captured diffraction pattern of the object.

It is further noted that Artigalas discloses that the use of "other types of sensors such as, for example, matrix-structure sensors, do[es] not depart from the scope of the present invention". Fowler et al. discloses an image sensor which includes pixel level A/D conversion, a technique which reduces the effect of parasitic capacitances on the readout bit lines (e.g. Column 4, Lines 13-17). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the image sensor of Fowler et al. to readout the spatial frequency-domain image data digitally rather than in analog form to reduce the effects of parasitic capacitances.

[claim 17]

Regarding claim 17, note that in order for an inverse Fourier transform to take place, the data must inherently be transferred to an image processor, further note that performing an inverse Fourier transform transforms frequency-domain data into spatial domain data.

[claim 18]

Regarding claim 18, Artigalas discloses placing a transform lens between the object and the imager wherein the transform lens performs a Fourier transform on the light traveling between the object and the imager (Figure 2, Item 91).

[claim 19]

In regard to claim 19, note that Artigalas lacks storing the spatial-domain image data in digital memory. However, it is well known in the art to store images in digital memory for later processing, printing or review (Official Notice). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to store the spatial-domain image data of Kostrzewski et al. to be able to process, print or review the image data at a later time.

[claim 20]

Regarding claim 20, Artigalas discloses note displaying of the spatial-domain image data on a television or "user interface" (e.g. Column 1, Line 5 - Column 2, Line 17).

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Artigalas (US 5,181,102) in view of Penney (US 5,515,112) in view of Fowler et al. (US 5,461,425) as applied to claim 15 above, and further in view of Nagumo (US 4,189,751).

[claim 16]

In regard to claim 16, note that Artigalas in view of Penney in view of Fowler et al. discloses a method which meets the requirements of claim 15 as discussed above. Therefore, it can be seen that Artigalas in view of Fowler et al. lacks a method which further comprises detecting and removing noise from the captured spatial frequency-domain image data.

Nagumo discloses a noise removal system to remove noise caused by inconsistencies which are inherent due to the manufacturing variations of solid-state

image sensors by detecting and removing noise signals from captured image data (e.g. Figure 2; Column 1, Line 31 - Column 2, Line 19). It would have been obvious to one of ordinary skill in the art at the time the invention was made to capture and remove the undesirable noise signals as taught by Nagumo to improve the quality of the captured image.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Henn whose telephone number is (571) 272-7310. The examiner can normally be reached on M-F 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy R. Garber can be reached on (571) 272-7308. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TJH
5/13/2005

WENDY R. GARBER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600